SECTION 12
Troubleshooting

This section provides information on hardware and software errors that occur during CP1L-EL/EM operation.

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12-1 Error Classification and Confirmation

Error Categories

Errors in CP1L-EL/EM CPU Units can be broadly divided into the following four categories.

Category	Comments
CPU Error	A WDT (watchdog timer) error is generated in the CPU Unit, the CPU Unit will malfunction, and operation will stop.
CPU Standby	The CPU will go on standby because conditions for stating operation have not yet been met.
Fatal Error	Operation cannot continue. Operation will stop due to a serious problem.
Non-fatal Error	A minor problem has occurred. Operation will continue

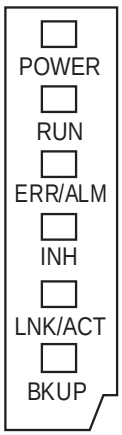
Confirming Errors

There are two sources of information on errors that have occurred.

- CPU Unit indicators
- Auxiliary Area

CPU Unit Indicators

These indicators show the operating status of the CPU Unit.



POWER (green)	Lit	Power is ON.
	Not lit	Power is OFF.
RUN (green)	Lit	The CPU Unit is executing a program in either RUN or MONITOR mode.
	Not lit	Operation is stopped in PROGRAM mode or due to a fatal error.
ERR/ALM (red)	Lit	A fatal error or CPU error (WDT error) has occurred. operation will stop and all outputs will be turned OFF.
	Flashing	A non-fatal error has occurred. Operation will continue.
	Not lit	Operation is normal.
INH (orange)	Lit	The Output OFF Bit (A500.15) was turned ON. All outputs will be turned OFF.
	Not lit	Operation is normal.
LNK/ACT (orange)	Lit	A valid link is detected.
	Flashing	Communications (either sending or receiving) are in progress through the Ethernet port.
	Not lit	Other than the above.
BKUP (orange) (See note.)	Lit	• The user program, parameters, or DM Area data is being written to or accessed in the built-in flash memory (backup memory). • The user program, parameters, DM Area data, or DM initial values are being written to or accessed in a Memory Cassette. • The BKUP indicator also lights while the user program is being restored when the power supply is turned ON.
	Not lit	Other than the above.

Note Do not turn OFF the CPU Unit power supply when this indicator is lit.

CPU Unit Indicators and Error Meanings in RUN or MONITOR Mode

Indicator	CPU error	CPU standby	Fatal error	Non-fatal error	Output OFF Bit turned ON
POWER	Lit	Lit	Lit	Lit	Lit
RUN	Not lit	Not lit	Not lit	Lit	Lit
ERR/ALM	Lit	Not lit	Lit	Flashing	---
INH	Not lit	---	---	---	Lit
LNK/ACT	---	---	---	---	---
BKUP	---	---	---	---	---

Auxiliary Area

■ Error Code Storage Word

The error code is stored in A400 when an error occurs. If two or more errors occur at the same time, the most serious error will be stored.

■ Error Flags

Flags that indicate the type of error are allocated in the Auxiliary Area.

■ Error Information

This area indicates specific information on the meaning of error flags and provides information on error location and error details.

■ Fatal Errors

Error	Error code (A400)	Error flag	Error information	
			Meaning	Address
Memory error	80F1	A401.15	Memory error location	A403
I/O bus error	80C0 to 80C7, 80CA, 80CE, 80CF	A401.14	I/O bus error details	A404
Too many I/O error	80E1	A401.11	Details for too many I/O error	A407
Program error	80F0	A401.09	Program error details	A294 to A299
Cycle time too long error	809F	A401.08	---	---
FALS instruction executed	C101 to C2FF	A401.06	---	---
Ethernet address error	80F6	A401.04	---	---

■ **Non-fatal Errors**

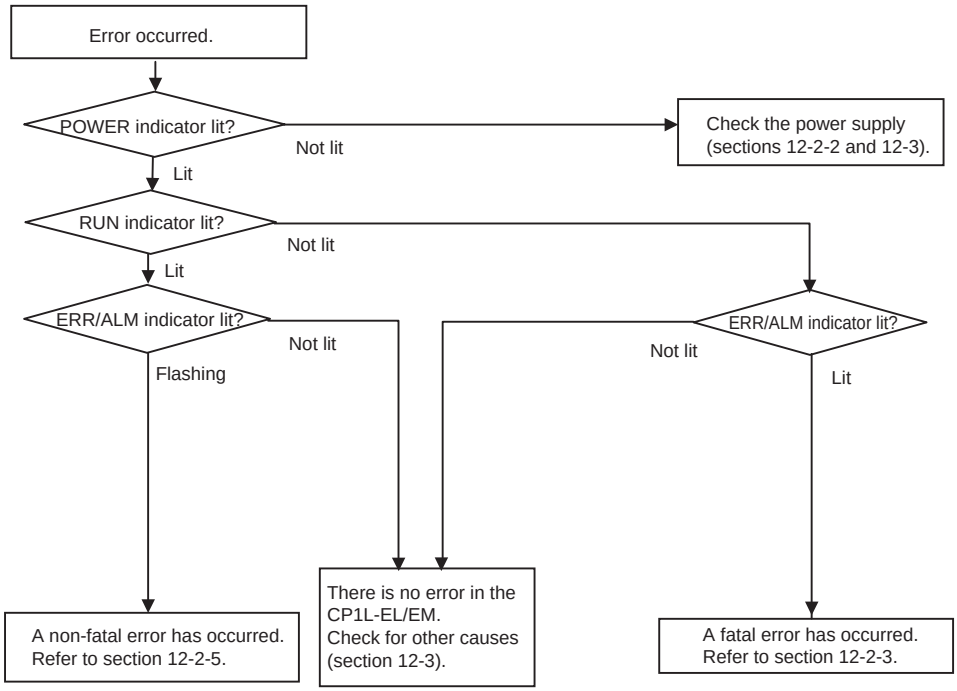
Error	Error code (A400)	Error flag	Error information	
			Meaning	Address
FAL instruction executed	4101 to 42FF	A402.15	Executed FAL number	A360 to A391
Flash memory error	00F1	A315.15	---	---
Interrupt task error	008B	A402.13	Interrupt task error unit number	A426
PLC Setup error	009B	A402.10		A406
Option Board error	00D1, 00D2	A315.13	Error Option Board Flags	A424
Battery error	00F7	A402.04	---	---
Logic errors in setting table	021A	A315.11	Routing tables error or Ethernet address tables error	A313
Built-in Ethernet error	03C0	A315.10	FINS/TCP connection setup error.An error in TCP connection setup including FINS/TCP connection setup	A313
	03C1		Server setup error.An error in server setup, including DNS server and SNTP server	
	03C4		Server connection error.An error in connecting with server, including DNS server and SNTP server	

12-2 Troubleshooting

Use the following procedure to check error details and remove the cause of the error if the CPU Unit does not operate when the power supply is ON, operation suddenly stops and the error indicator (ERR/ALM indicator) lights, or if the error indicator (ERR/ALM indicator) flashes during operating.

12-2-1 Error Processing Flowchart

Confirm the error category by referring to the status of the CPU Unit indicators, investigate the cause for the error in the error tables, and take corrective actions.



12-2-2 No Operation When Power Is Supplied

First confirm that the POWER indicator (green) is lit.

POWER Indicator Not Lit

The power supply may not match the Unit rating, wiring may not be correct, or the Unit may be faulty.

1,2,3...

1. Confirm the Unit rating (i.e., is it 24 VDC?) and see if the supply power matches the rating.
2. Check the wiring to see if it is correct and that nothing is disconnected.
3. Check the voltage at the power supply terminals. If the voltage is normal and the POWER indicator is not lit, the Unit may be faulty. In that case, replace the Unit.

POWER Indicator Turns OFF and ON

There may be fluctuations in the power supply voltage, disconnected wiring, or poor contacts. Check the power supply system and wiring.

POWER Indicator Lit but No Operation

Check the RUN indicator if the POWER indicator is lit but the CPU Unit does not operate. The CPU Unit may be on standby if the RUN indicator is not lit.

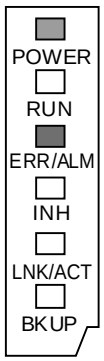
■ **CPU Standby**

Detection of Special I/O Units and CPU Bus Units has not been completed.

- If a CPU Bus Unit has not started normally, check the Unit Setup.
- If a Special I/O Unit is not detected, replace the Special I/O Unit.

12-2-3 Fatal Errors

■ **CPU Unit Indicators**



POWER	Lit
RUN	Not lit
ERR/ALM	Lit
INH	---
LNK/ACT	---
BKUP	---

There may be a CPU error or a fatal error if operation stops (i.e., the RUN indicator turns OFF) and the ERR/ALM indicator lights.

Data on fatal errors is displayed on the Error Tab Page of the CX-Programmer's PLC Error Window.

Take corrective actions after checking error details based on the CX-Programmer display message together with the Auxiliary Area Error Flags and error information.

Note

1. Errors are listed in order with the most serious errors first.
2. If two or more errors occur at the same time, the most serious error code will be stored in A400.
3. I/O memory will be cleared if a fatal error occurs (except those created with FALS instructions).
4. I/O memory will be held when the I/O Memory Hold Bit is ON, but outputs will be turned OFF.

Memory Errors

<table>
<tr><th colspan="2">Probable cause</th><th>Possible remedy</th></tr>
<tr><td colspan="2">Automatic transfer from the Memory Cassette at startup failed because the required data is not on the Memory Cassette.</td><td>Store the required data on the Memory Cassette.</td></tr>
<tr><td colspan="2">An error has occurred in memory. One or more bits in A403 will turn ON to indicate where the error has occurred. See below for details.
• Memory Error Location</td><td>See below.</td></tr>
<tr><td>A403.00 is ON</td><td>A checksum error has occurred in the user program.
The power supply was turned OFF when backing up the user program to flash memory.</td><td>Transfer the user program again.</td></tr>
<tr><td>A403.04 is ON</td><td>A checksum error has occurred in the PLC Setup.</td><td>Transfer the PLC Setup again.</td></tr>
<tr><td>A403.07 is ON</td><td>A checksum error has occurred in the routing tables.</td><td>Transfer the routing tables again.</td></tr>
<tr><td>A403.09 is ON</td><td>The contents of a Memory Cassette could not be normally read to the CPU Unit when power was turned ON.</td><td>Check to see if the files required for automatic transfer at startup are present on the Memory Cassette.</td></tr>
<tr><td>A403.10 is ON</td><td>There is a problem with flash memory.</td><td>A hardware error has occurred in the CPU Unit. Replace the CPU Unit.</td></tr>
<tr><td>A403.11 is ON</td><td>A checksum error has occurred in IP address table.</td><td>Transfer the IP address table again.</td></tr>
<tr><td>A403.12 is ON</td><td>A checksum error has occurred in IP router table.</td><td>Transfer the IP router table again.</td></tr>
</table>

■ **Reference Information**

Error flag	Memory Error Flag, A401.15
Error code (A400)	80F1
Error information	Memory Error Location, A403

I/O Bus Errors

An I/O bus error occurs in data transfer between the CPU Units and Units connected to the I/O bus. Cycle the power supply. If operation is not restored when the power supply has been cycled, turn OFF the power supply and check that connections are proper and that there is no damage.

Probable cause	Possible remedy
An error occurred in data transfer between the CPU Unit and an Expansion Unit or Expansion I/O Unit. **Note** 0A0A hex will be stored in A404.	Try cycling the power supply. If the problem persists, turn OFF the power supply and check the Connecting Cables between the Units to see if they are connected properly. Check the Unit connections to be sure they are ok (e.g., that there is no damage). After correcting the problem, turn ON the power to the Units again.

■ **Reference Information**

Error flag	I/O Bus Error Flag, A401.14
Error code (A400)	80C0, 80CA, 80CE, 80CF
Error information	I/O bus error details, A404 (0A0A)

Too Many I/O Points

The number of CP1W-series Expansion Units and Expansion I/O Units connected exceeds the restriction for the number of Units or words for the system configuration. Turn OFF the power supply and reconfigure the system within the restrictions.

Probable cause	Possible remedy
The number of CP1W-series Expansion Units and Expansion I/O Units exceeds the restriction.	• Connect a maximum of three Expansion Units and Expansion I/O Units to the CP1L-EM40D□-□ or CP1L-EM30D□-□. • Connect a maximum of one Expansion Unit or Expansion I/O Unit to the CP1L-EL20D□-□.

■ **Reference Information**

Error flag	Too Many I/O Points Flag, A401.11
Error code (A400)	80E1
Error information	Too Many I/O Points Details, A407

Program Error

A program error indicates a problem with the user program. Refer to the error information, check the program, and correct the mistakes. Clear the error once the problem has been corrected.

Probable cause	Possible remedy
Instruction Processing Error If the PLC Setup has been set to stop operation for an instruction error, the Error Flag will be turned ON when an instruction cannot be executed due to a problem in the operand data.	Refer to A298 and A299 (instruction program address when the program fails), check the specifications for the relevant instruction, and set the correct operand data. Alternatively, set the PLC Setup to not stop operation for an instruction error.
Indirect DM Addressing BCD Error If the PLC Setup has been set to stop operation for an indirect DM BCD error, the Access Error Flag will turn ON when the content of an indirectly addressed DM operand is not BCD although BCD mode has been selected.	Refer to A298 and A299 (instruction program address when the program fails), and correctly set the content for the indirectly addressed DM operand (BCD mode) to BCD or change the specified destination. Alternatively, change the indirect addressing to binary mode or set the PLC Setup to not stop operation for an indirect DM addressing BCD error.

Probable cause	Possible remedy
Illegal Area Access Error If the PLC Setup has been set to stop operation for an illegal access error, the Access Error Flag will turn ON when an illegal access error has occurred. The following operations are considered illegal access: • Reading/writing the parameter area • Writing to an area without memory installed • Writing to a write-protected area • Indirect DM addressing BCD error	Refer to A298 and A299 (instruction program address when the program fails) and take corrective actions so that illegal area access errors will not occur. Alternatively, set the PLC Setup so that PLC operation will not stop when an instruction error occurs.
No END Error This error occurs when there is not an END(001) instruction in the program within a task.	Insert an END(001) instruction at the end of the program allocated to the task stored in A294 (task number when the program fails).
Task Error This error is generated by any of the following conditions. 1. There is not an executable cyclic task (active). 2. There is no specified interrupt task when an interrupt is generated (input interrupt, high-speed counter interrupt, scheduled interrupt, or external interrupt).	1. Check the properties of the executable cyclic task and set at least one task to start when operation starts. 2. Create a task for the number stored in A294 (task number when the program fails).
Differentiation Overflow Error Differentiation instructions were repeatedly inserted or deleted using the online editor and the system restriction was exceeded.	Change the operating mode to PROGRAM mode and then return to MONITOR mode.
Illegal Instruction Error Execution of an unexecutable instruction was attempted. For a CPU Unit with 20 I/O Points, the instruction operand will be given in D10000 to D31999.	Check the program, correct the problem, and transfer the program to the CPU Unit again.
UM Overflow Error An attempt was made to execute a program that exceeds the user program capacity.	Transfer the program again using the CX-Programmer.

■ **Reference Information**

Error flag	Program Error Flag, A401.09
Error code (A400)	80F0
Error information	Program error details, A294 to A299

Cycle Time Too Long

Probable cause	Possible remedy
This error occurs when the cycle time PV exceeds the maximum cycle time set in the PLC Setup.	Review the program to decrease the cycle time or change the maximum cycle time set in the PLC Setup. Refer to the Maximum Interrupt Task Processing Time (A440) and study the maximum cycle time. The cycle time can be decreased using the following methods. • Separate instructions not being executed into different tasks. • Consider using jump instructions for areas in the task that are not executed. • Prohibit cycle refreshing with Special I/O Units that do not require exchange of cycle data.

■ **Reference Information**

Error flag	Cycle Time Too Long Error, A401.08
Error code (A400)	809F
Error information	---

Errors Created with FALS Instructions

Probable cause	Possible remedy
FALS instruction executed (FALS number 001)	C100 hex will be added to the FALS number (001 to 1FF hex) and the result will be stored in A400 as the error code (C100 to C2FF hex). Check the conditions for executing FALS instructions and remove any causes for the user-defined error.

■ **Reference Information**

Error flag	FALS Error Flag, A401.06
Error code (A400)	C101 to C2FF
Error information	---

Ethernet Controller Stop Error

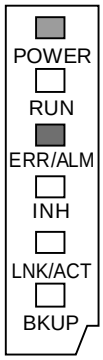
Probable cause	Possible remedy
ON when the Ethernet controller stops because of sum value of MAC address error or controller error.	Cycle the power supply. The Unit may be faulty. Consult your OMRON representative.

■ **Reference Information**

Error flag	Ethernet Controller Stop Address Error, A401.04
Error code (A400)	80F6
Error information	---

12-2-4 CPU Errors

■ **CPU Unit Indicators**



POWER	Lit
RUN	Not lit
ERR/ALM	Lit
INH	---
BKUP	---
LNK/ACT	---

A CPU error or fatal error may have occurred if the ERR/ALM indicator lights during operation (RUN mode or MONITOR mode), the RUN indicator turns OFF, and operation stops.

CPU Errors

Probable cause	Possible remedy
A WDT (watchdog) error occurred in the CPU Unit. (This does not occur in normal use.)	Cycle the power supply. The Unit may be faulty. Consult your OMRON representative.

■ **Reference Information**

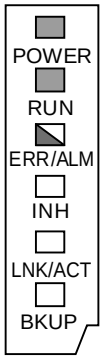
Error flag	None
Error code (A400)	None
Error information	None

Note Just as when a CPU error occurs, the RUN indicator will turn OFF and the ERR/ALM indicator will light when a fatal error occurs. Connecting the CX-Programmer, however, is possible for fatal errors but not for CPU errors. If the CX-Programmer cannot be connected (online), a CPU error has probably occurred.

12-2-5 Non-fatal Errors

A non-fatal error has occurred if both the RUN indicator and the ERR/ALM indicator are lit during operation (i.e., in RUN or MONITOR mode).

■ **CPU Unit Indicators**



POWER	Lit
RUN	Lit
ERR/ALM	Flashing
INH	---
BKUP	---
LNK/ACT	---

Information on the non-fatal error can be obtained from the Error Tab Page of the CX-Programmer's PLC Error Window. Take corrective actions after checking error details using the display messages and the Auxiliary Area Error Flags and error information.

- Errors are listed in the following table in order, with the most serious ones first.
- If two or more errors occur at the same time, the most serious error code will be stored in A400.

Errors Created with for FAL Instructions

A FAL instruction was executed in the program to create a non-fatal error.

Probable cause	Possible remedy
The executed FAL number 001 to 511 will be stored in A360 to A391. The number 4 will be added to the front of 101 to 2FF (which correspond to executed FAL numbers 001 to 511) and the result will be stored in A400 as error code 4101 to 42FF.	Check the conditions for executing FAL instructions and remove any causes of the user-defined error.

■ **Reference Information**

Error flag	FAL Error Flag, A402.15
Error code (A400)	4101 to 42FF
Error information	None

Flash Memory Errors

Probable cause	Possible remedy
A315.15 will turn ON when writing to the internal flash memory fails.	Replace the CPU Unit when the internal flash memory has been written to more than 100,000 times.

■ **Reference Information**

Error flag	Flash Memory Error Flag, A315.15 Other non-fatal flags, A402.00
Error code (A400)	None
Error information	None

Interrupt Task Errors

Probable cause	Possible remedy
An interrupt task error occurs when the *Detect Interrupt task errors setting* in the PLC Setup is set to *Detect* and an attempt is made to refresh a Special I/O Unit from an interrupt task with IORF(097) while the Unit's I/O is being refreshed by cyclic refreshing (duplicate refreshing).	Review the program to see whether detecting interrupt task errors can be disabled or avoided.

■ **Reference Information**

Error flag	Interrupt Task Error Flag, A402.13
Error code (A400)	008B
Error information	Interrupt Task Error, A426

PLC Setup Errors

Probable cause	Possible remedy
A set value error occurred in the PLC Setup. The address of the error is stored in A406 in 16-bit binary.	Correct the PLC Setup with correct values.

■ **Reference Information**

Error flag	PLC Setup Error Flag, A402.10
Error code (A400)	009B
Error information	PLC Setup error location, A406

Option Board Errors

Probable cause	Possible remedy
A315.13 will turn ON if the Option Board is removed while the power is being supplied.	Turn OFF the power supply and then install the Option Board again.

■ **Reference Information**

Error flags	Option Board Error Flag, A315.13 Other Non-fatal Error Flag, A402.00
Error code (A400)	---
Error information	---

Battery Error

Probable cause	Possible remedy
If the PLC Setup is set to detect battery errors, this error will occur when there is an error in the battery in the CPU Unit (i.e., the voltage is low or a battery is not mounted).	Check the battery connections. When using battery-free operation, disable connecting battery errors in the PLC Setup.

■ **Reference Information**

Error flag	Battery Error Flag, A402.04
Error code (A400)	00F7
Error information	---

Logic Errors in Setting Table

Probable cause	Possible remedy
An error occurs in routing table, IP address table, or IP router table	Transfer the relative setup again.

■ **Reference Information**

Error flag	Setting Table Logic Error Flag, A315.11 Other Non-fatal Flag, A402.00	
Error code (A400)	021A	
Error information (A313)	Error in Routing Tables	0003
	Error in Ethernet Address Tables	0004

Built-in Ethernet error

Probable cause		Possible remedy
A Built-in Ethernet error has occurred. A315.10 will turn ON to indicate where the error has occurred. See below for details. • Error Information		See below.
A315.10 is ON Error code (A400): 03C0	FINS/TCP Connection Setup Error When there is an error in TCP connection setup including FINS/TCP connection setup, the error occurs.	Confirm the connection setup and transfer again.
A315.10 is ON Error code (A400): 03C1	Server Setup Error When there is an error in server setup, including DNS server and SNTP server, the error occurs.	Transfer the server setup again.
A315.10 is ON Error code (A400): 03C4	Server Connection Error When there is an error in connecting with server, including DNS server and SNTP server, the error occurs.	Confirm the connection between the servers.

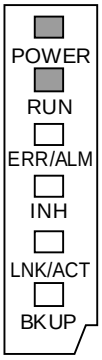
■ **Reference Information**

Error flag	Built-in Ethernet Error Flag, A315.10 Other Non-fatal Flag, A402.00	
Error code (A400)	03C0, 03C1, 03C4	
Error information (A313)	Leftmost byte: connection type and number FINS/TCP connection (01 to 03) Rightmost byte: error causes	03C0
	Leftmost byte: server type Rightmost byte: error causes	03C1, 03C4

12-2-6 Other Errors

Communications Errors

■ **CPU Unit Indicators**



POWER	Lit
RUN	Lit
ERR/ALM	---
INH	---
LNK/ACT	---
BKUP	Not lit

Probable cause	Possible remedy
An error has occurred in the communications between the Ethernet port and connected device.	Confirm that the Ethernet port settings in the PLC Setup are correct. Check the Ethernet cable and replace it if necessary.
An error has occurred in the communications between the serial port and connected device.	Confirm that the serial port 1/2 settings in the PLC Setup are correct. Check the cable wiring. If a host computer is connected, check the serial port settings and program in the host computer.

Ethernet Communication Error

When Ethernet Communication Error occurs during FINS communication service by built-in Ethernet port, the error code, error contents and error's time will be stored in A40 to A44.

The detail information of error code and error contents show as the following table.

Error code (Hex)	Error content	Detailed information	
		1st byte	2nd byte
0105	Node address setting error (send failed)	Commands Bit 15: OFF Bits 08 to 14: SNA Bits 00 to 07: SA1 Responses Bit 15: ON Bits 08 to 14: DNA Bits 00 to 07: DA1	
0107	Remote node not in network (send failed)		
0108	No unit with specified unit address (send failed)		
010D	Destination address not in routing tables (send failed)		
010E	No routing table entry (send failed)		
010F	Routing table error (send failed)		
0111	Command too long (send failed)		
0112	Header error (send failed)		
0117	Internal buffers full; packet discarded		
0118	Illegal packet discarded		
0119	Local node busy (send failed)		
0120	Unexpected routing error		
0121	No setting in IP address table; packet discarded		
03C3	FINS/UDP packet discarded		
03C2	FINS/TCP packet discarded	01 to 03: Connection number	02: Reopened because remote node closed 03: Reopened because of reception error 04: Reopened because of transmission error 05: Reopened because RST received from remote node 06: Reopened because of no keep-alive response 07: Illegal FINS/TCP procedure 08: Insufficient memory during server processing 09: Insufficient memory during client processing 0A: Insufficient memory during node switching
03C6	Clock data write error	0001: Clock data cannot be refreshed because of a CPU Unit error. 0002: Clock data cannot be refreshed because the current CPU mode do not support operation.	